Booted Eagle and Nest (*cf.* p. 325).

THE ZOOLOGIST

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BIRDS NESTING IN ANDALUSIA.

By Reg. B. Lodge.

(Plate V.)

This season (1905) has been a disastrous one for the birds as well as for the people of Spain, especially in the south of that country. No rain having fallen since October, except two half-days in April, the crops proved a complete failure, causing widespread distress and poverty. The effect on the marsh and wading birds can be easily imagined, for as there were no marshes the birds did not put in an appearance, and those few which might be seen did not appear to be nesting. In the Marismas, where in normal years you may see shallow water stretching to the horizon, enlivened with thousands of Flamingoes, Stilts, Avocets, Pratincoles, the beautiful Southern Herons, and Marsh Terns in myriads, and where I have seen eggs picked up literally by the basketful, there was hardly a drop of water. Over the parched and dried-up mud, baked to a brick-like hardness, were a few Kentish Plovers, Redshanks, and Peewits. We heard of two (!) Flamingoes several miles away, and saw perhaps altogether in about a fortnight some dozen Pratincoles. Round the half-starved groups of cattle were a few Buff-backed Herons, but their usual nesting place was completely dried up, and stamped out of existence by the cattle in their thirst seeking the last drop of moisture; there were also some in the neighbourhood of the Laguña de la Janda, but it was too early then for them to be nesting; indeed, I doubt whether they ever do nest there. In this last locality we saw two or three pairs of Cranes, which from their behaviour seemed to be about to nest, but we left before they had begun to do so (April 21st). There were also some flocks of Whiskered Terns, and many Marsh-Harriers and White Storks, with a few Purple Herons and Mallards.

In the plains, which in April were ablaze with colour from the many wild flowers which are such a conspicuous feature of the Spanish spring-time, perhaps the most common bird was the Corn-Bunting, of which we found many nests on the ground, generally at the foot of a tall plant somewhat like a lily. The Stonechat was also nesting in similar situations. The Calandra Lark and Crested Lark were also very common, and we found nests of both species. On the topmost twigs of the bushes sat numbers of Woodchats, their chestnut heads looking almost blood-red in the sunshine. Their nests, like those of the Grey Shrike (*Lanius meridionalis*), were always made of some whitish-coloured twigs, and were rather loosely constructed. In one locality we found several in the trees of a large orange orchard, as also many nests of Goldfinches, and one of an Orphean Warbler. Both Goldfinches and Serins are exceedingly numerous. Blackbirds were fairly common, and we saw several nests; but the Song-Thrush is, I believe, a winter visitor only. We only saw two, one as late as the end of April. The Blue Rock-Thrush was seen at Gibraltar, and invariably whenever we were among rocks.

The first Bee-eater was seen from the train on March 30th, an early date for it; their first appearance in numbers was on April 15th, on which day the telegraph-wire was crowded with them. Nightingales were heard on April 13th, Turtle-Doves April 19th, and Cuckoo April 13th. House-Martins were building on March 30th. Many Crag-Martins, Lesser Kestrels, and Pallid Swifts were seen at Ronda on March 31st. A Hoopoe was noticed on March 30th. Black Chats were beginning to nest at Ronda on April 3rd. White Storks were observed on

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their nests on farmhouses near Córdoba on March 31st. Many Russet Wheatears, as well as another species not identified, and Stonechats, in the neighbourhood of Ronda, were flitting about the stone walls dividing the fields. The Common Wren and Orphean Warblers were seen in same place on April 2nd. On April 20th, while climbing to a Griffon's nest, a Wren's nest was seen built against the back of a cave high up in the rocks.

One of the chief objects of our expedition was to see something of the larger birds of prey, and if possible to obtain photographs of them.

At Ronda, where we saw the first Griffon within five minutes after leaving the station on our first arrival, we made an attempt to attract them by a bait, by exposing a sheep's head, which was connected by a thread to the shutter-release of a concealed camera. Though they discovered the bait immediately, one of the great scavengers flying overhead before we had finished the concealment of the camera, they refused to descend so far down into the valley. The selected spot was on a buttress or spur of rock, which projected from the perpendicular cliff on the top of which is perched the town of Ronda. Within a short time of seeing the first one there were four Griffons sailing overhead, and presently ten of the huge birds were in sight, but by degrees they mounted higher and higher in the sky, and finally vanished. Their place was taken then by four or five Egyptian Vultures, which approached much nearer, and even settled on the side of the rocky slope not far away; but they also failed to come to close quarters, and eventually, though we waited until the light began to fail, we had to give it up, and take the camera home unsuccessful. The Spaniards told me that in a month's time I should have no difficulty, for after the bull-fight the dead horses would be thrown over the cliff, and the Vultures would then assemble from far and wide, and could be photographed without any trouble.

However, we could not stop so long, and, though the same plan was tried in several localities with different baits, we did not succeed in getting a photograph that was any good. Once a Dog was photographed which had been attracted by the bait.

The camera had been set at the remains of a Pig which had been devoured by Griffons that morning. Unfortunately we only found it too late, when nothing but a few bones were left, by seeing great numbers of Griffons flying round, while we were wading about in search of Cranes' nests. Creeping up behind a Donkey that happened to be grazing close by, I was able to focus about thirty Griffons sitting in a circle round some bones; but instead of making sure of one plate, thinking they were gorged, I tried to get a little nearer, and lost the chance, for they all took alarm and flew off; the last diners to leave being two Marsh-Harriers, which were busily engaged in securing the fragments left by the larger birds.

One thing was very striking at all these attempts—the quickness with which the bait was discovered; every time there was either a Griffon or a pair of Egyptian Vultures soaring overhead before the camera was duly arranged and hidden, although none were in sight at the beginning. I think now that if we had put a whole carcase, either a Pig or kid, we should have succeeded. A dead Rabbit was also tried on the sand-dunes in the same way for Kites or Eagles. The first day the bait was carried off bodily, and the string snapped without releasing the shutter. Probably a Booted Eagle had swooped down and carried off the bait without alighting, for there was no track or sign of footprint on the fine sand on which it lay. The next day the bait—another Rabbit put in the same place—had been partly eaten, judging from the footprints around, by a Kite. Two Kites were soaring over the spot, but on developing the plate, on my return, it was found to be badly fogged. Waiting so many hours, only covered by the roller-blind shutter, in the burning sun of Andalusia had been too great a trial. Although my trapping was so unsuccessful, it was partly from bad luck, and I think a prolonged attempt on similar lines would lead to some good results with the numerous birds of prey to be found in the sierras and forests of Spain.

But if we failed in photographing Griffons at a carcase, we succeeded in finding one within range of a telephoto lens while sitting in its nest by the side of a half-grown young one, and, by clambering into another nest with camera and tripod, in photographing a young bird in down, the occupant thereof; and also in getting eggs from adjacent nests (April 20th, addled). There was very little smell noticeable at their nests, which were neatly made, and big enough to hold three of us at once. We also took several clutches of Egyptian Vultures, and twice found them nesting in company with Griffons. When sitting in their nesting-caves in the face of the precipice, these immense birds appear to be no larger than Starlings.

We saw altogether three Bonelli's Eagles. One of these, while flying near a griffonry, in which, though we did not see it, was possibly its own eyrie, appearing to resent the near approach of a Griffon, made a magnificent "stoop," and knocked it fairly head over heels, though it soon recovered itself again. We were shown, on April 5th, a nest in a tremendous "tajo," quite six hundred feet in height, and very overhung. While some goat-herds were pointing out the nest to us the Eagle left it, and flew across the narrow gorge, giving us a fine view of it; and from another nest about a fortnight later we took the single egg by means of a rope. This egg, which was addled, was long and pointed, and faintly splashed with reddish markings.

A nest was found of the Short-toed Eagle in a silver poplar, containing two eggs—an unusual number, this Eagle generally laying but one egg.

The Booted Eagle we found very abundant, eight nests being found in pine trees and poplars at the end of April and beginning of May, containing one and two eggs, and in one case three well-grown young. At one nest we obtained a photograph of the bird itself, and noticed the curious note of this small but plucky Eagle. At first I took it for the note of some unknown bird the size of a Blackbird or Oriole, and what was my surprise to see that it proceeded from a Booted Eagle which was sitting on the ground not more than ten yards from my hiding-place. It sounded like "kivi, kivi," rather wild and sweet, not at all what you might expect for an Eagle. At another nest, while engaged up the tree in manipulating a camera, and lashing the tripod to a convenient branch, the bird flew in and settled close to, and remained an instant or two before dashing out again with a scream. There were two white eggs in this nest, which was built in a stone-pine, and also half a young Rabbit. (A female Booted Eagle shot was of a dark uniform brown colour all over, breast as well as back. The cere and legs of a pale lemon-yellow.)

We were somewhat late for the Common Kite by the time we reached the pine forests (April 26th), but saw many of the birds, and found one nest containing an egg and two young. (By the bye, I have only once found less than three as the clutch of the Kite, and more often than not have found three eggs in nests of the Black Kite, though towards the middle of May, if they have been robbed a good deal in the district, many nests will have but two. An undoubted nest of the Black Kite contained three eggs, and a very choice assortment of rags. In 'Wild Spain,' Chapman gives two eggs as the usual number, and says the Black Kite uses no rags.) The Black Kites had suffered a good deal from the charcoal-burners, who eat both Kite's and Eagle's eggs. (A boy told me he had eaten a clutch of "Polluela" eggs, either Little, Spotted, or Baillon's Crake, for they have but one word for the three.) Many Peregrines, probably on migration, were flying over these forests, and apparently sitting in empty nests. From one such in a large pine-tree, on a second visit a week or ten days afterwards, we took four Raven's eggs. Kestrels, too, were frequently seen, but only one clutch of eggs was found. Two pairs of Marsh-Harriers were nesting in a small patch of reeds, the only remnant of what should have been an immense marsh.

Great numbers of Red Deer were to be seen round the Marisma district, and on the dried mud were seen on several occasions two of the famous wild Camels.

Below I give lists of species seen in 1897 and 1905, with dates for some of the migratory birds, and eggs.

SPECIES SEEN IN 1897.

Blackbird
Great Reed-Warbler
Blue Tit
Golden Oriole
Grey Shrike (*meridionalis*)
Woodchat
Swallow
Martin
Sand-Martin
Greenfinch
Serin
Goldfinch
Sparrow, ? sp.
Chaffinch
Reed-Bunting; eggs
Starling (*unicolor*); eggs
Magpie; eggs
Jackdaw; eggs, May 7

Raven ; eggs, May 5
Swift
Nightjar (*ruficollis*)
Wryneck ; April
Woodpecker (*sharpii*)
Kingfisher ; April
Roller
Bee-eater ; eggs, May 7
Golden Oriole ; April
Hoopoe
Cuckoo
Great Spotted Cuckoo
Barn-Owl ; young, April 30
Little Owl ; eggs, May 7
Scops Owl
Egyptian Vulture
Marsh-Harrier
Montagu's Harrier
Short-toed Eagle
Booted Eagle ; eggs
Imperial Eagle
Kite ; eggs, April 30
Black Kite ; eggs, May 2
Kestrel ; eggs, April 30
Lesser Kestrel
Peregrine
Purple Heron ; eggs, May 1
Little Egret ; eggs, May 5
Buff-backed Heron ; eggs, May 5
Night-Heron ; eggs, May 8
Glossy Ibis ; eggs, May 8
Squacco Heron ; eggs, May 8
White Stork
Spoonbill ; eggs, May 1
Flamingo
Mallard
Wood-Pigeon ; eggs
Turtle-Dove
Partridge, French
Coot ; eggs
Stone Curlew ; eggs
Pratincole ; eggs, May 3
Ringed Plover
Kentish Plover ; eggs, May 6
Curlew ; April.
Redshank ; eggs, May 3
Lapwing ; eggs
Avocet ; eggs, May 13
Stilt ; eggs, May 3
Green Sandpiper
Dunlin ; end of April
Godwit, ? sp. ; end of April
Black Tern ; eggs, May 4
Whiskered Tern ; eggs, May 4
Little Grebe

SPECIES SEEN IN 1905.

Blackbird ; eggs, April 16
Thrush
Blue Rock-Thrush ; April 4
Russet Wheatear ; April 1
Black Chat ; nesting, April 3
Whinchat ; May 9
Stonechat ; April 16
Nightingale, April 13 ; eggs, May 11
Great Reed-Warbler
Rufous Warbler ; May 6
Orphean Warbler, April 2 ; eggs, May 5
Melodious Warbler ; eggs, May 11
Black-headed Warbler ; eggs, April 25
Dartford Warbler ; young, April 17
Great Tit ; eggs, May 9
Blue-headed Wagtail ; April 2
White Wagtail
Wren ; nest, April 20
Richard's Pipit (?)
Golden Oriole ; May 6
Grey Shrike ; eggs, May 4
Woodchat ; eggs, April 15
Spotted Flycatcher ; May 5
Pied Flycatcher ; May 6
Tree-Creeper
Swallow ; nesting, March 30
Crag-Martin ; March 31
Martin ; nesting, March 30
Chaffinch
Serin
Greenfinch
Goldfinch ; eggs, April 20
Sparrow, ? sp.
Corn-Bunting ; eggs, April 14
Starling (*unicolor*)
Magpie ; eggs, May 9
Raven ; eggs, April 26
Jackdaw ; eggs, May 1
Crested Lark ; eggs, April 19
Calandra Lark ; eggs, April 15
Dresser's Short-toed Lark
Swift
Pallid Swift ; March 31
Nightjar (*ruficollis*)
Woodpecker (*sharpii*)
Bee-eater ; March 30
Golden Oriole ; May 6
Hoopoe ; March 30
Cuckoo ; April 13
Barn-Owl

Scops Owl (heard)
Griffon; eggs (addled), and young, April 20
Egyptian Vulture; eggs, April 17
Marsh-Harrier; eggs, May 1
Bonelli's Eagle; egg (addled), April 20
Short-toed Eagle; eggs, April 25
Booted Eagle; eggs, April 27
Imperial Eagle
Kite; eggs and young, April 27
Black Kite; eggs, April 26
Kestrel; eggs, May 1
Lesser Kestrel; March 31
Peregrine; end of April
Purple Heron; April 14
Little Egret; April 10
Buff-backed Heron; April 13
White Stork; nesting, March 31
Mallard
Wood-Pigeon
Turtle-Dove; April 19
Rock-Dove
Partridge, French
Quail; April 16
Crane, Common; April 19
Great Bustard
Little Bustard
Pratincole; May 1
Kentish Plover; May 1
Ringed Plover
Dusky Redshank
Redshank; May 1
Common Sandpiper
Lapwing; May 1
Stilt; May 1
Whiskered Tern; April 13

TASMANIAN NOTES TAKEN IN 1903: THE LITTLE PENGUIN (*EUDYPTULA MINOR*).

By J. R. McClymont.

June 23*rd.*—I have been watching a Little Penguin pursue small fish. It was but a few yards from the shore of the River Derwent, but, as the water was somewhat muddy, its movements under water could not be discerned. As the result of its actions many little fishes—perhaps Sand-Smelts—leapt out of the water. The Penguin appeared on the surface of the water at intervals of about half a minute, and swam or floated on the surface for but a few seconds before again diving. These proceedings continued for about ten minutes, after which time the bird disappeared. It had doubtless swum away to some distance under water. The depth of the water in which the pursuit of the small fish took place was from two to four feet, and the bottom is of sand and shells. A Silver Gull was attendant upon the Penguin's actions, and when the latter appeared on the surface would fly to the spot, as if it expected to obtain food dropped by the Penguin. This Gull sometimes follows Cormorants when they are catching fish.

24*th.* — Two Penguins in the flesh were sent to me from Norfolk Bay. They were males, and measured 17 in. and 17½ in. in length. They were in the plumage which I surmise is that of birds not quite mature—that is to say, the space below the eyes was greyish white, whereas in those birds which, I opine, have completed the changes of plumage there is underneath the eye a band of slaty blue about one-fifth of an inch wide, which extends from the lore to the aural region. The birds without this band I believe to be the *Spheniscus undina* of Gould's 'Birds of Australia,' vol. vii. P. 85; those with the band the *S. minor* of the same work (vol. vii. P. 84). I cannot, however, positively affirm that *Eudyptula minor*, Forst., and *E. undina*, Gould, are the same species, and use the name *Eudyptula minor* provisionally to denote the birds which resemble those figured in the two plates above mentioned. The basal portions of the feathers of the throat and fore neck of the above-mentioned specimens were tinged with black, but this colour was not permanent, but disappeared in the process of preserving.

October 20*th*.—Two Little Penguins, on which nestling down still adhered in a few places, forming, *e.g.*, a ruff round the neck of one of them, were received from Norfolk Bay. They were in a small wooden case, and snapped at my fingers when they were thrust into the case, and also snapped occasionally at one another. They uttered a sound resembling the hiss of a Goose, but much less loud. The eye had a watery appearance, and the iris was light green.

A NESTLING PENGUIN.

21*st*.—I have liberated the two young Penguins. When they were taken out of the case and placed on a sandy beach they appeared to be somewhat dazed, and remained motionless; but when I placed them in the water they became animated, and swam away with apparent ease. The receding wave may have imparted an impetus.

December 22*nd*.—Two nestling Penguins were received. They were younger birds than the two previously mentioned, and were clad entirely in down, inclusive of the flippers. The down was smoke-grey, except on the lower part of the breast and the abdomen, where it was dingy white.

23*rd*.—I have had one of the nestlings photographed (*ante*, p. 330). I wished to have both birds photographed in one picture, but they were extremely obstinate and self-willed, and could not both be kept motionless. After many attempts one bird was kept motionless, and two negatives obtained. One of these shows the bird in a standing attitude, with the tarso-metatarsus in contact with the ground. After being photographed it was given to a friend, and lived on very friendly terms with his spaniel, but at last disappeared, and its fate is unknown.

Sandy Bay, Tasmania.

BIOLOGICAL SUGGESTIONS.

EXTERMINATION IN ANIMAL LIFE.

Part I. — By Natural or non-Human Agency.

By W. L. Distant.

(Continued from p. 292.)

To understand some processes of actual extinction of species, it is necessary to study causes that tend toward that result, factors which alone are not destructive, but which combined, or recurrent, eventually act as do a persistent series of non-mortal ailments on the human constitution, sapping its vitality, and rendering it vulnerable to an attack not essentially destructive. In nature we meet with many of these sporadic phenomena, which we consider much rarer than they really are, and this partially from our paucity of observations and records, and also largely incidental to our usually spending our existence in one area. On the island of Sakhalin, which at present is of some political notoriety, the peat-formation of the tundras, according to Prof. von Krasnow, reaches in many places a thickness of fifty feet, and beneath it upright fossil larch-stems, which have been buried *in situ*, can often be seen. The destruction of these woods might be ascribed to a change of climate, but another explanation may also be found. "The snow, owing to the cold and gloomy summer, lies as late as July under the shelter of the forest on badly drained clayey soil. The surface, constantly damp, becomes covered with a growth of swamp vegetation, which more and more prevents the access of the summer air and the thawing of the soil. Thus the conditions become more and more unfavourable to the growth of the forest, till even the moisture-loving larch gives place to the bare tundra. All the wide plains of Sakhalin have therefore been transformed into tundras and half-frozen peat-bogs, and a true polar landscape prevails wherever mountains or hills are absent."* Dr. Philippson considers the steady destruction of forests in the Peloponnesus as due in a large measure to the characteristics of the Mediterranean climate. "In the Mediterranean region, with its scorching rainless summers, its mostly violent rains in other seasons, and its rare frosts, the formation of new soil is slower and denudation more rapid than in Central and Northern Europe. Hence, when forests are destroyed, bare rocky slopes are exposed, unless maquis (dense evergreen scrub) succeed in getting a hold before the last of the soil is washed away. When the maquis again are removed, whether by accidental fires or of the action of the charcoal-burners (their great enemy), their place is taken by still more meagre forms—either the stunted kermes oak, or the scattered prickly phrygana."† It is unnecessary to refer to the effects of these changes on animal life.

Knapp has recorded that in 1825, for many miles round his residence, and with his ignorance as to further extension, scarcely any female calves were born. "Dairies of forty or fifty cows produced not more than five or six, these of inferior numbers in the same proportion, and the price of female calves for rearing was greatly augmented."‡ He appositely remarks, in the wild state an event like this would have considerable influence upon the usual product of some future herd. To grasp the full bearing of this record we require much further information, especially as to the nature of that season's grass, or the previous season's roots. Geddes and Thomson state that a general conclusion, "more or less clearly grasped by numerous investigators, is that favourable nutritive conditions tend to produce females, and unfavourable conditions males."§ Thus bad crops, or a partial famine, might primarily cause a preponderance of male births, and subsequently, if at all recurrent, bring about a diminution of individuals; in other words, unusual meteorological conditions might seriously diminish that portion of a flora absolutely important to the nutriment of a dependent fauna, and so, without actually causing starvation, might effect a preponderance in male births, and also the introduction of a weakening or destructive element advancing the decline which precedes the fall.

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* Rept. of paper read at Berlin Geogr. Soc. Jan. 4th, 1896, *cf.* 'Geograph. Journ.' vol. vii. p. 423.

† Petermann's "Mittheilungen," 1895, No. 12, *cf.* 'Geograph. Journ.' *l. c.* p. 426.

‡ 'Journ. of a Naturalist,' p. 139, *note.*

§ 'Evolution of Sex,' p. 50.—Dr. Hecker has stated that, after the cessation of the Black Plague, a greater fecundity in women was everywhere remarkable—a grand phenomenon, which, from its occurrence after every destructive pestilence, proves to conviction, if any occurrence can do so, the prevalence of a higher power in the direction of general organic life. Marriages were, almost without exception, prolific; and double and treble births were more frequent than at other times.—('The Epidemics of the Middle Ages,' translated by B. G. Babington, p. 31.)

This brings us to the consideration of droughts and their primary and secondary consequences. It is extremely difficult to focus the information on this subject, as it is scattered about in different publications of various nationalities. Even when found often little is recorded, and where fuller records exist they are often inaccessible. Darwin of course has observed and graphically recorded the effect of drought, when travelling in South America. "The period included between the years 1827 and 1830 is called the 'gran seco,' or the great drought. During this time so little rain fell that the vegetation, even to the thistles, failed; the brooks were dried up, and the whole country assumed the appearance of a dusty high road. This was especially the case in the northern part of the province of Buenos Ayres and the southern part of St. Fé. Very great numbers of birds, wild animals, cattle, and horses perished from the want of food and water. . . . The lowest estimate of the loss of cattle in the province of Buenos Ayres alone was taken at one million head. A proprietor of San Pedro had previously to these years 20,000 cattle; at the end not one remained." * We can well imagine the effect that an occasional drought like this must cause to much animal and vegetal life, but, when droughts are recurrent, extinction rather than depopulation must ensue to many species in the course of time. Darwin himself further remarks: "These droughts to a certain degree seem to be almost periodical; I was told the date of several others, and the intervals were about fifteen years." † Livingstone has described a similar infliction in South Africa: "The place where we first settled with the Bakwains is called Chonuane, and it happened to be

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* 'Journ. Research. Voy. Beagle,' pp. 132–133 (1860).

† *Loc. cit.* p. 134, *note*.

visited, during the first year of our residence there, by one of those droughts which occur from time to time in even the most favoured districts of Africa; . . . in our second year again no rain fell. In the third the same extraordinary drought followed. Indeed, not ten inches of water fell during these two years, and the Kolobeng ran dry; so many fish were killed that the Hyænas from the whole country round collected to the feast, and were unable to finish the putrid masses. . . . I put the bulb of a thermometer three inches under the soil in the sun at midday, and I found the mercury to stand at 132° to 134°; and if certain kinds of beetles were placed on the surface, they ran about a few seconds and expired."* A great drought also prevailed in South Africa in the year 1862, subsequent to the one described by Livingstone. It was very severely felt in the Lesuto, which is a territory generally blessed with abundant rains at stated periods. In this portion of the country, by the month of November, no traces of vegetation remained, the vast grass plains becoming mere sandy deserts from the excessive heat that prevailed. The largest streams ceased to flow. Cattle died by thousands. The mighty Orange River could be stepped across by a child, and in its upper part, at least, ran dry.† Can any naturalist or sportsman read this account without involuntarily estimating the loss to animal and vegetal life which must have ensued, and which to many endemic species must have meant extinction, and to others the diminution that precedes decay and annihilation? In marching across Laikipia, in eastern Central Africa, Dr. Gregory found here and there around a water-hole "acres of ground white with the bones of Rhinoceros and Zebra, Gazelle and Antelope, Jackal and Hyæna, and among them we once observed the remains of a Lion. All the bones of the skeleton were there, and they were fresh and ungnawed. The explanation is simple. The year before there had been a drought which had cleared both game and people from the district. Those which did not migrate crowded round the dwindling pools, and fought for the last drop of water. These accumulations of bones were therefore due to a drought."‡ A similar observation was made by

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* 'Missionary Trav. in S. Africa,' pp. 20 and 21.

† *Cf.* Croumbie Brown, 'Hydrology of S. Africa,' p. 112.

‡ 'The Great Rift Valley,' p. 268.

Neumann at Lake Rudolph: "Alongside a rocky gully, right on the lake side, a patch of the black lava *débris* was covered thickly with bleached bones. From a distance it looked like snow, and I wondered what in the world it could be; but on getting close I found it to consist of the whitened bones of 'Camels.' Hundreds must have perished here, all huddled in one little corner." * A gradual desiccation is generally believed to have prevailed in South Africa for a long time past, and the process is not confined to that continent. According to Semon, the climate and meteorological conditions of Australia are such at present that a single drought of several years' duration can and often does exterminate all the aquatic inmates of a river. Few rivers have a lake-reservoir which they could feed upon in times of drought. The lack of water-treasuring mosses is likewise a prominent feature of the Australian bush. A drought setting in—and the short history of Australia tells us of periods when not a single raindrop has fallen for three or four years in a district known as commonly subject to rains—a whole river area is liable absolutely to dry up, and its animals will be exterminated, with exception of such as withstand desiccation in either their fully formed or embryonic state.† Arabia, especially the southern part, is stated to be still drying up. Water is disappearing from places where it used to exist, and the inhabitants are migrating towards Persia. The word famine is often an equivalent to that of drought, but the results recorded are usually confined to the destruction of human life, though we can generally realize how many species of other animals and plants have suffered and succumbed to these visitations. It may be sufficient to refer to the great drought in Egypt in the year 1060, when the Nile failed to flow for seven successive years, and one of the greatest famines on record occurred; in the years 1730–33 great drought and famine existed at the Cape de Verd Islands; whilst a similar event in India in 1876–78 is still in our own recollection.

It must be also remembered that, without actual extinction, a drought will often effect great morphological changes in plants, and that such may initiate constitutional weakness. Sign. Bolos wrote to the Rev. G. Henslow from Olot (Genova) that in consequence of a great drought such a transformation took place in a plant of *Rosa sepium* that it became unrecognizable. "The stalks, leaves, and flowers were reduced to half their size, the stems became much more thorny, the leaves, calyces, and flowers much more glandular." *

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* 'Elephant-Hunting in East Equatorial Africa,' p. 261.

† 'In the Australian Bush,' p. 89.

Estimating the natural phenomena of the past by our knowledge of those of the present, as we are compelled to do by the limits of our experience and intelligence, we may conclude that certain sporadic loss in animal life occurred then as now,† and of which we have not the particulars or summary. Such was a scarcity and epidemic among insects at Chontales recorded by Belt in 1872, and of Wasps in North Wales in 1865.‡ Many records exist, and are frequently made both in these islands and on the Continent, as to years of scarcity in insect life, though this cannot of itself be considered in the light of an exterminative process, for often a prolific follows a meagre entomological year, but it is not difficult to imagine that should such a year of scarcity in insect life be also a year of great drought, or be attended or succeeded by a period of other disadvantages, then such a diminution in numbers to contest excessive mortality would probably prove fatal to many species. These coincidences must sometimes occur in the struggle for existence; it is not the adverse circumstances, or the single malady, which is difficult to conquer; but when adversity occurs in manifold directions, or an illness assumes the form of a complication of diseases, then the society or the individual succumbs. All life, including that of man, can only bear a certain strain; a central attack may be repulsed, but when the flanks are turned at the same time a disaster is inevitable. Some sixty years ago the Sousliks (*Spermophilus* sp.) suddenly disappeared in the neighbourhood of Sarepta, in south-eastern Russia, in consequence of some epidemics; and for years no Sousliks were seen in that neighbourhood. It took many years before they became as numerous as they formerly were.* Mr. Guthrie, who noticed the occurrence of the larvæ of a blue-bottle (*Calliphora*) in the nostrils of Toads, writes that it is probable that the number of Toads is largely kept under by those means. In 1872 Toads were remarkably plentiful in the neighbourhood of Tenby, South Wales, and he noticed that the disease was very prevalent among them. In the following year scarcely any could be found, and he saw none diseased.† That epidemics do occur among wild birds is well known, and Dr. Stejneger records an instance with the Pelagic Cormorant (*Phalacrocorax pelagicus*) of the Commander Islands. "Thousands upon thousands" of these birds died during the winter of 1876–77, so that masses of dead birds covered the beach all round the islands.‡ Brehm, when travelling among the Ostiaks in Siberia, witnessed the devastating effect of splenic fever or anthrax among Reindeer. In the immediate neighbourhood of one tshum—the hut of the Ostiak—he counted seventy-six dead Reindeer. "Wherever the eye turned it lighted on carcases, or on beasts both young and old, lying at their last gasp. . . . The unfortunate herd, which had started from the Ural two thousand strong, and had now dwindled to a couple of hundred, whose path was marked by a line of carcases, was collected afresh around the tshum, but next morning there were again forty corpses around the resting-place." § The epidemic among the mammals of South Africa a few years ago is still in our recollection. In the same country, Gordon Cumming, writing half a century ago, describes the Goat as being in many districts "subject to a disease called by the Boers 'brunt-sickta,' or burnt-sickness, owing to the animals inflicted with it exhibiting the appearance of having been burnt. It is incurable; and if the animals infected are not speedily killed, or put out of the way, the contagion rapidly spreads, and it is not uncommon for a farmer to lose his entire flock with it. This sad distemper also extends itself to the *feræ naturæ.* I have shot Hartebeests, Black Wildebeests, Blesbucks, and Springbucks with their bodies covered with the disease. I have known seasons when the three latter animals were so generally affected by it that the vast plains throughout which they are found were covered with hundreds of skulls and skeletons of those that had died therefrom." * At Buenos Ayres, the Coypú (*Myiopotamus coypú*) was much more abundant some fifty years ago than now, and its skin, which has a fine fur under the long coarse hair, was largely exported to Europe. About that time the Dictator Rosas issued a decree which made the killing of a Coypú a criminal offence. The result was that the animals increased and multiplied exceedingly, and, abandoning their aquatic habits, they became terrestrial and migratory, and swarmed everywhere in search of food. Suddenly a mysterious malady fell on them, from which they quickly perished, and became almost extinct.† Sometimes we can trace the interdependent conditions of these visitations. The liver-fluke of the Sheep (*Distomum* (*Fasciola*) *hepaticum*), as is generally known, is dependent on a small water-snail (*Limnæa truncatula*) as the intermediate host in which its earlier larval, sporocyst, and redia stages are passed through. The wet years 1816, 1817, 1830, 1853, and 1854—memorable for the occurrence of acute liver-rot in England, Germany, and France—showed that the weather also plays a considerable part in extending the suitable ground for *Limnæa* over wide areas, which in dry years may be safe pastures. In 1830 England lost from this cause one and a half million Sheep, representing some four millions of money; while in 1879–80 three millions died. In 1862 Ireland lost sixty per cent. of the flocks, and in 1882 vast numbers of Sheep perished in Buenos Ayres from this cause.‡ It is reported that there had been a scarcity of wild animals and birds in Nicaragua since the great hurricane of 1865.§

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* 'The Origin of Plant Structures,' p. 47.

† Of course this is a postulate requiring great qualification; for, as the late Sir J. F. Stephen argued, "All our anticipations involve an assumption utterly incapable of proof, that the future will resemble our present conception of the past."—("Necessary Truth"; 'Contemporary Review,' vol. xxv. p. 73.)

‡ 'Naturalist in Nicaragua,' pp. 180 and 181.—With Wasps, however, as recorded by Mr. Norman, "It is a curious fact that occasionally when queen Wasps have been unusually numerous in the spring, and there is every reason to expect a great abundance of Wasps, there are nevertheless very few in the autumn; while in other years, as in the case now (1851), after having had apparently a great paucity of queens, Wasps are very numerous."—('Zoologist,' vol. ix. p. 3236.)

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* Becker, 'Bull. Soc. Moscou,' 1889, p. 625.

† *Cf.* Pocock, 'Roy. Nat. Hist.' vol. vi. p. 68.

‡ *Cf.* Lucas, 'Rept. Nat. Mus.' Washington, 1891, p. 637.

§ 'From North Pole to Equator,' pp. 412–13.

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* 'Five Years' Hunt. Advent. in S. Africa' (Compl. Pop. Ed.), p. 74.

† Hudson, 'The Naturalist in La Plata,' p. 12.

‡ *Cf.* Gamble, 'Cambridge Nat. Hist.' vol. ii. p. 67.

§ Collinson, *cf.* Brown, 'Countries of the World,' vol. iii. p. 38.

In 1880 a remarkable mortality occurred among the fishes of the Gulf of Mexico, which was ascribed to "poisoned water." In 1844, and again in 1854, and especially in 1878, similar fatalities had occurred. The earlier manifestations appear to have been the floating up of vast quantities of dead sponges—chiefly "loggerheads." According to Mr. E. Ingersoll, the attack of 1880 began suddenly, and immediately followed the terrible hurricane which is known as the "August gale," the fish and all other ocean life suddenly dying in hordes all along the southern (eastern) shore of Tampa Bay, on Egmont Key, at its mouth, which was its most northern point, and thence southward as far as Shark River, in Whitewater Bay, on the coast. Thence fatal localities were to be found in the currents that set southward through Bahia Honda Passage, through the North-west Passage beyond Key West, and even out in the neighbourhood of the far isolated Tortugas. Everywhere throughout this whole extent of coast, except in the mouths of the rivers and in the shallow bayous, all the forms of sea life died as though stricken by a plague fatal alike to all, and were drifted upon the beaches in long windrows so dense that near human habitations men were obliged to unite in burying them to prevent a pestilential stench, or to haul them away by wagon-loads to be prepared for manure, as was done in some cases. Besides fishes, sponges, crabs, and great numbers of molluscs were destroyed.* Mr. Ingersoll suggests that eruptions of volcanic gases may have taken place through the bottom of the sea. Mr. M. A. Moore wrote that about 1878, "whenever a smack with a full fare, *i.e.* a full cargo of fine healthy fish in her well, sailed into this poisoned water, every fish would die, and they would have to be thrown away." † Mr. S. H. Johnson states that "after very heavy rains and overflowing of rivers, the inner bays on the Texas coast suffer a loss of from one-half to three-fourths of their stock of salt-water fish, not including Mullet, which live as well in fresh as salt water." . . . "After a heavy rain and a freeze" in the winter of 1880–1, "all the salt-water fish in the *Laguna del Madre* (a large sheet of water lying between Padre Island and the mainland) were found dead on the banks." ‡

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* 'Proc. U.S. Nat. Mus.' vol. iv. pp. 74–6.

† *Ibid.*, p. 125.

‡ *Ibid.*, p. 205.

Accidents in field and flood are not uncommon. Thus with the North American Bison, whose almost extirpation has been caused by man, other agencies effected a thinning-out process. It is stated that in 1867 upwards of two thousand Bison out of a herd of four thousand were lost in a quicksand; and that an entire herd of about one hundred head perished when crossing the ice on a lake in Minnesota.

The almost complete destruction of the Cray-fish (*Potamobia fluviatilis*) on the Thames was due to a disease, which first appeared near Staines and worked its way up the river, "with as much method as enteric fever worked its way down the Nile in the Egyptian campaign after Omdurman." * Even insect pests may thin out mammals. We read in the daily press that a flock of six thousand Sheep belonging to G. A. Brundrett, and feeding on Matagorda Islands, Texas, were driven by Mosquitoes into the water of Cedar Cañon. All but four hundred were drowned. The island is so infested (1902) with Mosquitoes that families have had to abandon their homes.†

On the other hand, it seems very evident that after unfavourable seasons which may have proved inimical to animal life, other circumstances may arrive which considerably add to the fecundity of species, and thus much loss may be repaired. There are facts to support this view. The Short-eared Owl (*Asio accipitrinus*), whose number of eggs is generally four, has been known when food is unusually abundant, as during a Lemming migration, to produce a clutch of seven or eight; and during a recent Vole plague in Scotland, in some instances as many as thirteen eggs were recorded. A similar instance has been narrated with reference to Trout at Vermont, North America. In a pond formed by damming a small stream to obtain water power for a saw-mill, and covering one thousand acres of primitive forest, the increased supply of food brought within reach of the fish multiplied them to that degree that, at the head of the pond where in the spring they crowded together in the brook, which supplied it, they were taken in the hands at pleasure, and swine caught them without difficulty. A single sweep of a small scoop-net would bring up half a bushel, carts were filled with them as fast as if picked up on dry land, and in the fishing season they were commonly sold at a shilling (eightpence halfpenny, or about seventeen cents) a bushel. The increase in the size of the Trout was as remarkable as the multiplication of their numbers.*

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* Cornish, 'Naturalist on the Thames,' p. 52.

† 'Express,' October, 1902.

Again, the disappearance of an animal—especially a fish—is not necessarily due to extinction. In 1879 there was captured, off the coast of Massachusetts, a new species of Tile-fish, to which the name of *Lopholatilus chamæleonticeps* was given. Of this fish large catches were made, and it was expected it would rank among the most important food-fishes of the United States. But after a short interval the *Lopholatilus* disappeared, and soon good reasons for its absence were discovered. In the months of March and April, 1882, vessels arriving at Philadelphia, New York, and Boston reported having passed large numbers of dead or dying fish scattered over an area of many miles, and from descriptions and the occasional specimens brought in it was evident that the great majority of these were Tile-fish. As one account after another came in it became apparent that a vast destruction of fish had taken place, for vessels reported having sailed for forty, fifty, and sixty miles through floating fish; and in one case the schooner 'Navarino' ploughed for no fewer than one hundred and fifty miles through water dotted as far as the eye could reach with dying fishes. From careful computations made by Capt. Collins, it seemed that an area of 5000 to 7500 square statute miles were so thickly covered with dead or dying fish that their bulk "must have exceeded the enormous numbers of one billion." The cause of this sudden and vast mortality has been considered as due to some unusual lowering of temperature in the warm belt of Gulf Stream slope, which brought immediate death to so many of its inhabitants.† The Tile-fish, however, though it has disappeared from its original locality, or the area wherein it was first observed, is not extinct. In 1892, Col. Marshall McDonald, the Commissioner of Fisheries, made another attempt to discover the fish, and was successful in finding it at five different stations, so that this Tile-fish is restored to the list of existent species of the North Atlantic coast.* A deep-sea Crustacean, *Munida iris*, was also very common on the Tile-fish grounds, so numerous, in fact, that it gave character to the ground; yet when the U.S. Fish. Co. steamer 'Albatross' went over the same ground two years later, the hauls of the beam-trawl showed that this species, formerly so abundant, was wanting. It is interesting to note that the bottom Crustacea suffered at the same time as the Tile-fish, and probably from the same cause.†

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* Thompson, 'Nat. Hist. Vermont,' p. 142. *Cf.* Marsh, 'Man and Nature,' p. 115.

† *Cf.* Lucas, 'Rept. Nat. Mus.,' Washington, 1891, pp. 648–49.

Sudden, severe, and protracted gales of wind are destructive to animal life. Birds by these agencies are frequently blown out to sea, and must perish in this manner in considerable numbers. Many such observations have been, and are still, recorded in the 'Zoologist.' An excellent account of this destructive agency in Scotland has appeared from the pen of Mr. W. Evans. In October, 1898, a severe easterly gale set in on the 14th of the month, and but for a temporary lull on the 16th continued without cessation till the morning of the 19th. A natural result of so protracted a gale from the direction of the open ocean was, of course, an exceptionally heavy sea in the Firth of Forth. Mr. Evans, searching for the effects of this gale, gives a graphic and detailed account of the destruction in animal life he found on the shores and beaches. Hundreds of the Cat- or Wolf-fish (*Anarrhichas lupus*) were cast up on the beach in the neighbourhood of North Berwick. On October 26th no fewer than two hundred and four were counted between the harbour and a point opposite the island of Fidra. The majority of those seen were from two to three feet in length. No forms of life fared worse than some of the Lamellibranchs. "Whole colonies of certain species must have been literally ploughed up and swept bodily away by the terrific ground swell, and after much tossing to and fro deposited in a dead or dying state on the gently sloping beach."‡ Sir H. Maxwell relates that during a "mighty gale" which visited Scotland on December 22nd, 1895, thousands of Rooks perished. They were killed by fallen trees, or blown from their roosts and dashed against the swaying boughs. From a rookery in Lord

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* *Cf.* Goode & Bean, 'Oceanic Ichthyology,' p. 288.

† Benedict, 'Proc. U.S. Nat. Hist. Mus.' vol. xxvi. p. 245 (1902).

‡ 'Ann. Scott. Nat. Hist.,' 1899, pp. 6–11.

Stair's grounds in Wigtonshire there were collected the day after the storm the corpses of upwards of five hundred Rooks.* Cyclones in the Pacific islands have tended to the disappearance of some land birds. Mr. W. W. Gill, a South Sea missionary, once well known to anthropologists, writes: "Some years ago, for three successive seasons, cyclones devastated some of the islands of this group (Rarotonga). Consequently the 'Kakirori' (a bird larger than a Sparrow, with bright brown plumage), two species of which were once common, especially in the neighbourhood of the sea, was (it was believed) exterminated." †

With all allowances, however, it cannot be denied that by purely natural causes we can trace in our own time very much destruction in animal life, destruction slowly, surely and frequently leading to extinction. Just as we find in nature processes which make for the survival of the fittest; or, again, the perpetuation of new varietal forms that arise in a suitable environment, so we see other agencies tending to the utter disappearance of species which have reached their zenith in evolutionary adaptability. We may well study the death as well as the origin of species. We are apt to only observe the devices in nature by which many species survive, and often ignore the constant natural phenomena which doom so many species to destruction. The species, like the individual, has its limit in time,‡ and may be said to only endure on nature's sufferance. Estimating these natural calamities in the past by the observation of those occurring in the present, the extermination of so many "missing links" is not a weakness, but a proof in the conception of evolution, the net result of natural causation.

[In 'Nature' for August 31st (p. 434) an onslaught has appeared in the form of an anonymous paragraph on our first contribution on this subject. It is stated that "the article is marred by several serious mistakes." For the correction respecting Marsupials we thank our unknown critic, but he has *omitted to mention* that the statements he controverts were not given as our own, but as a *verbatim* quotation from the writings of Mr. J. M. Tyler, Professor of Biology at Amherst College, Mass., and the quotation was given with exact reference to publication; not for new facts in distribution, but to show that author's attitude in regard to the question of "missing links." Any argument based on inaccuracies is of course beyond the pale of legitimate consideration; but we have little doubt that, like Prof. Tyler, our anonymous critic, who writes as "a man set under authority," must cry *mea culpa* himself.

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* 'Memories of the Months,' p. 71.

† 'Jottings from the Pacific,' pp. 127–8.

‡ Prof. G. H. Darwin, in his recent Presidential Address to the British Association at Cape Town, remarked: "The degree of persistence or permanence of a species, of a configuration of matter, or of a State, depends on the perfection of its adaptation to its surrounding conditions. If we trace the history of a State, we find the degree of its stability gradually changing, slowly rising to a maximum and then slowly declining."

We are also told that "minor errors, such as nummulitids for nummulites, are also noticeable." No mention is unfortunately made of the other minor errors, and certainly this "error" only exists in the imagination of our critic. The genus *Nummulites* belongs to the family *Nummulitidæ*, and the word "Nummulitid" is used, as it is usual to speak of one of the *Arachnidæ* as an "Arachnid." The term "Nummulitids" has been employed, to give one instance only, by the late Prof. Rupert Jones, who was at least a master on this subject. We do not deny that the term Nummulites may not be, nor is not frequently used, but certainly not without a capital letter as written by our very confident critic.*]

(To be continued.)

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* The paragraph also contains a remonstrance against the method of editing this magazine in reference to Mr. Steele-Elliott's note (*ante*, p. 308) on the Lesser Horseshoe Bat, referred to by that writer as *Noctilio hipposideros*. It is urged that "the editor might have pointed out that *Noctilio* is not the generic title for these Bats." Our contributor doubtless chose a rather archaic genus in thus following the terminology of Bechstein; but how far in generic nomenclature is alteration compulsory in these pages? Our best and latest authorities, and those which we should undoubtedly follow ourselves, are Mr. Oldfield Thomas (*cf.* Zool. 1898, p. 97) and Mr. Millais in his 'Mammals of Great Britain and Ireland.' These writers are practically in accord as regards the nomenclature of British Bats, and, except in one or two instances, in disagreement with the generic identifications of Mr. Lydekker ('Handbook to the British Mammalia,' 1896). Our critic, to be logical, would therefore seem to advise that, at least as regards British Bats, the generic names given by Lydekker should be suppressed in our pages; a drastic method we have no intention to pursue.

NOTES AND QUERIES.

AVES.

Breeding Habits of the Great and Blue Tits.—With reference to Mr. Jourdain's note *re* the breeding habits of the Blue and Great Tits (*ante*, p. 309), asking for particulars of any instances in which a second brood has been reared, it may be stated that in this district (north-west Yorkshire) neither of these species appears to be double-brooded, or if so but seldom. Are even our resident birds as many-brooded in the north of England as one might infer from the literature on this subject?—E. P. Butterfield (Wilsden).

Late Nesting of Linnet (Linota cannabina).—On Aug. 17th my gardener called me to see a Linnet's nest with three eggs in a bush of the arbor-vitæ kind just in front of my drawing-room windows. The eggs were hatched out on Aug. 29th, and to-day (Sept. 9th) the young have just left the nest. I have known young Linnets to be in the nest in August before this, but never as yet in September. This species is unusually abundant here this year, and has twice built in my garden, for the first time in my experience. I may mention that, though this late nest is hardly a dozen yards from the house, I have never once seen the cock bird either on the nest or anywhere near it.—W. Warde Fowler (Kingham, Chipping Norton).

Breeding of the Crossbill (Loxia curvirostra) in Northamptonshire. Definite records of the breeding of this species in Northants are very scarce. The late Lord Lilford, in his work on the 'Birds of Northampton' (p. 204), mentions two pairs having bred at Deene in 1902, and birds have been killed during the summer months in other localities. It was therefore with the greatest interest that I received two young Crossbills for examination, which were picked up by a keeper underneath a fir-tree on March 28th, 1904, at Harleston Firs, on the estate of Earl Spencer. They had probably fallen from the nest, and were covered with ants. Fortunately the keeper noticed the unusual size and strength of the bill, and took the birds to a birdstuffer at Northampton for preservation. Mr. C. E. Wright, who kindly sent the birds for my inspection, informs me that there were a good many Crossbills in the Firs during the winter of 1903-4. As Dr. Hartert has recently separated the English Crossbill (*L. curvirostra anglica*) subspecifically from the Scotch birds (*L. c. scotica*), a description of the nestling plumage may be of interest. Description: Basal half of lower mandible and greater part of upper mandible dark horn colour; anterior half of lower mandible and lower edge of upper yellowish white. Feathers of crown, cheeks, and nape have broad dark smoke-brown median stripe; rest of feathers grey, tinged with yellow, especially behind the eye and on the cheeks, and showing more grey on the nape. Throat, breast, and abdomen greyish white, tinged with yellow, with narrow smoke-brown median stripe to feathers. Scapulars and wing-coverts dark smoke-brown edged with ochre. Primaries smoke-brown, with very narrow ochreous anterior edges and tips faintly edged light brown. Secondaries more distinctly tipped with ochreous yellow. Feathers of back dark smoke-brown in middle, sides ochreous yellow. Tail wanting. — F. C. R. Jourdain (Clifton Vicarage, Ashburne, Derbyshire).

Late Nest of Yellow Bunting. — When out walking on the 27th of August, I came across a beautiful new nest of the Yellow Bunting (*Emberiza citrinella*) containing one egg. I returned to it on the 30th, and found four eggs, but no sign of the bird. However, on the following day I found the hen bird sitting on the nest. Considering that the elevation of this spot is nearly 600 ft., this seems to me a very late record, even for a Yellow Bunting. This bird does not winter in this locality.—T. Thornton Mackeith (The Hall, Caldwell, Renfrewshire).

Notes on the Green Woodpecker (Gecinus viridis).—During the present year a pair of Green Woodpeckers utilized for nesting purposes an old excavation in a pollard willow, in which last year a brood of Wrynecks were reared. The nesting site being within a few yards of my house, I had ample opportunity for observation. When food was brought to the young by the parent bird it usually settled upon a limb of the tree growing upwards from the trunk several feet lower than the position of the nesting hole; it would then by a succession of backward jumps descend until it reached the trunk of the tree, and then climb upwards—a retrogressive movement I cannot call to mind with any other bird. A quantity of food is brought to the young at a time, but one more clamorous than the others would often receive all. The food is carefully placed (evidently by the action of the parent bird's tongue) well inside the throat of the young. — J. Steele-Elliott (Dowles Manor, Shropshire).

Egg-depositing by Cuckoo.—I am glad to see a note on above subject from Mr. W. Wilson, for previously we "Bradford Nats," who have taken a great interest in this subject, somehow got the impression that the Twite (*Linota flavirostris*) was the favoured (!) foster-parent in Aberdeen. Mr. Wilson asks for information of the breeding of the Twite farther south. I might state that here we have the Twite as a breeding species on many of our moors, and we wondered how it was that the Cuckoo did not select them as in other districts. If you strike a moor with the Twite breeding thereon, you are certain to find a goodly number within a few hundred yards; hence we expect to find them in little colonies. Although I have found many nests of this species, I have never seen a Cuckoo's egg in one; last year (1904) we received a report of one by a younger brother of Mr. Ruskin Butterfield, but we failed to locate it. Here the Meadow-Pipit (*Anthus pratensis*) is almost the only bird selected as the victim for the Cuckoo's ill-mannered youngster's early welfare, although in 1899 I found a Cuckoo's egg in the nest of a Pied Wagtail (*Motacilla lugubris*), which seems to be about the exception to the rule. The Twite's full clutch in early spring is usually six. On May 20th of this year I had the pleasure of the company of Mr. Forrest (of Shrewsbury) on a visit to a little colony of Twites breeding within half an hour's walk of where I live, and he will be able to substantiate what I say, that Twites breed in goodly numbers near here, and that we have every opportunity of studying them.—W. H. PARKIN (Studholme, Shipley, Yorks).

Dunlin (Tringa alpina) in Surrey.—On Sept. 3rd I visited Frensham Pond, on the borders of Surrey and Hampshire. I was very pleased to see two Dunlins on the north side of the pond; they were very tame, allowing an approach of six or seven feet. Having plenty of time to spare, I watched them for a considerable time. Once or twice I approached too near, when, uttering their note "purre," they flew twenty or thirty yards farther up the side of the pond, and quietly settled down to feed. They very often were knee-deep in the water, and sometimes when the water came up higher than usual, there being a strong wind, they would fly up and retire a little way on to the sand, only to run forward again and repeat the performance. Both birds were in good condition, and seemed quite at home with their surroundings. I might also mention that the Great Crested Grebes (*Podicipes cristatus*) have bred last year, and again this, and at the time of writing have five young ones, which are nearly as large as their parents.—L. B. MOURITZ (6, Esmond Road, Bedford Park, W.).

Dusky Redshank in Kent, Squacco Heron and Icterine Warbler in Sussex.—On May 29th, 1905, a fine pair of Dusky Redshanks (*Totanus fuscus*), in summer plumage, were shot at Jury's Gap, Lydd, Kent. On June 3rd, 1905, a fine male Squacco Heron (*Ardea ralloides*), in full plumage, was shot in a grass-field near Rye, Sussex. On June 26th, 1905, a beautiful male Icterine Warbler (*Hypolais icterina*) was shot at Peasmarsh, about three miles from Rye, Sussex. The above were all brought to Mr. Bristow, of St. Leonards-on-Sea, to be set up, and are now in my collection.—J. B. Nichols (Parliament Mansions, Westminster).

Additional Notes on the Birds of Richmond Park.—

Sparrow-Hawk (*Accipiter nisus*).—Sometimes seen, although but rarely. It is probable, however, that there is at least one pair resident in the park.

Jay (*Garrulus glandarius*).—Since writing my previous notes I have seen this bird on three occasions. There are at least half a dozen pairs, which are generally to be seen or heard in the pond or Isabella plantation.

Redwing (*Turdus iliacus*).—An unfrequent winter visitor.

Garden-Warbler (*Sylvia hortensis*) and Chiffchaff (*Phylloscopus rufus*).—After further observations I find that these birds are not so common as I formerly stated; in fact, the former bird seems to have disappeared this year, whilst I have only heard the latter on three or four occasions.

Nightingale (*Daulias luscinia*).—This bird, although fairly numerous in different localities which border the park-walls, is very seldom found in the interior. Sometimes I have heard them in the Isabella plantation, but this year they seem to have deserted even this situation.

Meadow-Pipit (*Anthus pratensis*).—I might add to my former note on this species that it is essentially a winter visitor, seldom being seen during the summer months.

Tree-Sparrow (*Passer montanus*).—This species is more numerous of late, and I believe that a pair bred this spring in the willows on the island. On several occasions I saw birds, after feeding on the refuse at the side of the pond, fly on to the island.

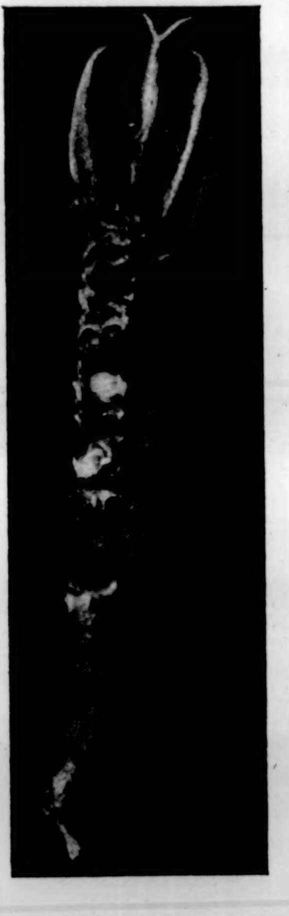
Bullfinch (*Pyrrhula europæa*).—Although, as formerly stated, I have no record of this bird, two of my friends have observed the species. It must therefore be ranked as an occasional visitor.

Reed-Bunting (*Emberiza schœniclus*).—Since writing my note on this bird (*ante*, p. 187) I have found that there are a pair, and I believe they bred in the bracken near the east corner of the smaller pond.

Little Grebe (*Podiceps fluviatilis*). — On April 23rd I and three friends saw a Dabchick on the larger pond. Returning about an hour and a half later I could find no trace of it. One of my friends told the headkeeper about this, who said it was an extraordinary thing, but for the last three years a Dabchick, presumably the same bird, had been seen on the ponds for an hour or two, sometimes for a day, towards the end of April or the beginning of May. Surely this is curious!—L. B. Mouritz (6, Esmond Road, Bedford Park, W.).

CRUSTACEA.

Remarkable Lobster-claw. — On Aug. 17th a local fish-hawker named Jerrard, who supplies me with many strange fishes and crustaceans, brought me a pincer-claw of the Norwegian Lobster (*Nephrops norvegicus*), locally known as the Norway Shrimp. As will be seen by the photograph, the malformation is of a most extra-



ordinary kind, an extra chela growing as it were distinctly out from the claw between the fixed and free-working points, ending in a V-shaped extremity. The Lobster was an adult specimen, and had not recently cast its "shell," as may be inferred by the presence of numerous acorn barnacles comfortably affixed to the claw. I might add that this species is now being largely brought into this port by trawlers from the vicinity of the Dogger Bank and "the other side"; certainly tons have been sold here this summer for purposes of food, the public having learned to appreciate its delicacy; they run from a halfpenny apiece to three-halfpence. When stacked, tier upon tier, on our fishmonger's slabs, their quaint and pretty forms attract the eyes of the passer-by. Eight inches from rostrum to the end of the tail is about the length of a full-grown specimen. It is rare on the eastern seaboard; I have but one undisputable record of its occurrence in my particular district, but have found it packed in the stomachs of deep-sea Cods.—ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

Correction of Misprints (Zool. August, 1905, p. 313).—For *cairns* read *caves*, last line; for "*different people's*" read "different *peoples'*"; for "Dalnaglas" read "Dalnaglar," fifth line from foot. — J. A. HARVIE-BROWN (Dunipace, Larbert, Stirlingshire, N.B.).

THE ZOOLOGICAL SOCIETY'S GARDENS.

To the general public the most attractive addition to the Zoological Gardens during August was a female Gorilla, brought from the Gaboon, and deposited by Mr. J. D. Hamlyn. She is probably about five or six years old. She has proved no exception to the rule that these Apes are a source of the greatest anxiety to those who have charge of them, for although apparently healthy and in good condition she refused to feed for the first few days after being placed in the Apes' House, and after a great deal of tempting with all manner of delicacies took at the end of that time nothing more substantial than a few grapes and oranges. By the time these lines appear in print she will be on her way to America, having been bought by the Director of the New York Zoological Gardens. To the collection of Ungulates have been added two young male Red Deer, born in the menagerie; a pair of Dorcas Gazelles, adult and in perfect condition, deposited by H.M. the Queen, and a young pair of West African Marsh Buck

(*Limnotragus gratus*), brought from the Gaboon, and deposited by Mr. J. D. Hamlyn. Both are of a rich chestnut-red and marked along the sides from the shoulder to the rump with about nine white stripes and with many white spots as well upon the hindquarters. The male has as yet no trace of horns, and is in all respects like the female. In the event of the animals staying in the Gardens, it will be interesting to note the gradual change of colour of the male to the smoky-brown characteristic of the adult.

The great event in the bird line during August was the completion of the large new Aviary for Sea Gulls. This occupies the area between the Seal Pond and the Pigsties. The opposite face of the rockwork in the Seal Pond is included within the wirework, and forms a natural-looking cliff for the birds to perch and nest on. Trees are left growing in the Aviary, which rises to a height of about thirty feet. There is a large pond running nearly its whole length along the front, and a smaller one at the back, the banks of both being fitted with ornamental rockwork. Here may be seen Sea Gulls, Cormorants, Herons of various sorts, Gallinules, Kestrels, and Choughs. It is especially hoped that the Choughs, including both the alpine and Cornish species, may breed on the rockwork next spring.

In a previous number of the 'Zoologist' reference was made to a recently established community of Burrowing Owls and Prairie Dogs. The pair of Owls has successfully reared a young one, which, when about half-grown, appeared at the entrance of the burrow under guard of the parents, who fiercely drove off every Prairie Dog that ventured too near. The protective vigilance displayed by the Owls suggests fear for the safety of the young if left to the tender mercies of the rodents; and the greed with which the latter fight over and devour the dead rats or fowls' heads put in the enclosure for the Owls shows that the fear of the old birds has probably a strong foundation in fact. It is interesting to record that the Owls themselves have a liking for the Prairie Dog's food, and may not infrequently be seen eating the cabbage-stalks with which the rodents are provided.

All the eggs laid by the Struthious birds this season in the Gardens proved infertile after trial in the incubators. Ample amends for this disappointment, however, have been made by the Common Rheas. The cock bird, after "sitting tight" for the proper time, hatched out eight young ones in the small enclosure set apart for these birds, an event which has not occurred in the Gardens for over half a century. He started by sitting upon a few eggs, and the hen subsequently laid the remainder of her stock within his reach, and these he pulled beneath him with his wings. The brood is now about three weeks old, and seems likely to flourish.

Amongst the many reptiles deposited by Mr. Rothschild, some Snakes from the Gaboon stand out as of peculiar interest, namely, two very fine examples of the Nose-horned Viper (*Bitis nasicornis*); also an equally large example of a second species of the genus, namely, *Bitis gabonensis*, not previously exhibited in the Gardens. There is also a large West African Cobra (*Naia melanoleuca*). The specimens of *Bitis*, though deadly and, to many, repulsive to look upon, cannot but excite admiration on account of the exquisite beauty of their colouring; while an admirable instance of warning coloration is furnished by the Cobra with his dorsal surface jet-black, and his throat and neck yellow with jet-black stripes, the prevalent uniform and badge of poisonous animals. This is displayed to full advantage as the Snake stands facing his adversary, with hood erect, in his characteristic attitude of self-defence.

R. I. P.

OBITUARY.

JOHN WILLIAM DOUGLAS.

FULL of years, and having outlived his zoological contemporaries, the oldest contributor to the 'Zoologist' passed away on August 28th, at Morningside, Craven Park, Harlesden. He had reached the age of ninety-one years, and was the author of some dozen contributions to the first volume of this magazine, published in 1843.

It is as an entomologist that Douglas will be remembered, and as one belonging to the last century, for he had during recent years lived in retirement, and outside his closest friends had been little heard of. He was perhaps one of the last collectors to see a living *Chrysophanus dispar* in this country, which he did at Whittlesea Mere in 1841. He joined the Entomological Society in 1845, and became Secretary in 1849, when the Society was in considerable financial difficulty, and was described by Stainton in a Presidential Address as "an efficient Secretary of good *business habits*."

EDITORIAL GLEANINGS.

We have received the Annual Report of the Indian Museum for the year 1903–1904. In the Natural History section we read that "The most momentous event of the past year has been the receipt from the Government of India of a grant of five lakhs of rupees for the general improvement of the museum: among other things the grant provides for the purchase of land for, and the construction of, much-needed outhouses and conveniences for museum servants."

The following paragraph is of more than purely Indian interest:—"Among other radical proposals that have disturbed the Zoological Section is that of the Director of the British Museum (Natural History) that all the Indian Museum 'types' should be transferred to the great central institution under his charge. It is the opinion of the authorities of the British Museum—an opinion which in itself is most reasonable—that the climate of Calcutta is inimical to that enduring preservation which 'types' demand, that the isolated situation of Calcutta renders our 'types' as objects of reference almost useless, and that therefore the interests of science would, in every way, be advanced by the transfer of the 'types' to the chief working centre of the British Empire. The Trustees, however, so far as the types received from the Asiatic Society go, were debarred from agreeing to the proposal, and, outside their obligations to the Asiatic Society, were disinclined to consent to it, for fear of handicapping workers in India."

In the Seventeenth Annual Report of the Delegates of the University Museum (Oxford) for 1904, we read in the statement of the Hope Professor of Zoology that an important acquisition to the entomological collection has been acquired in the splendid collection of Oriental Hymenoptera, containing large numbers of types, bequeathed to the Department by Mr. G. A. James Rothney, F.E.S., together with his fine British collection of the same order, the manuscript notebooks relating to the collections, and the parts of his library dealing with this group of insects.

We quite agree with the remark that "when the Rothney Collection of Hymenoptera is added to the collections of W. W. Saunders, Sir Sidney Saunders, F. W. Hope, J. O. Westwood, to the numerous types of Frederick Smith, and to the large number of accessions registered in these reports during the past ten years, the most interesting of all the orders of insects will be represented in Oxford by one of the great collections of the world."

THE following important additions have been made to the menagerie of the Zoological Gardens, Giza, near Cairo, Egypt, by the members of the staff of these gardens who left Cairo for the Sudan on May 10th last, and returned on August 10th with the following live animals:—One very fine young female Giraffe (*Giraffa camelopardalis*) from Kordofan, deposited by H.H. the Khedive, three African Elephants, fifteen Sudanese Lions, one Libyan Cat (*Felis ochreata*), three Genet-Cats (*Genetta dongolana*), three White-tailed Mongeese (*Herpestes albicauda*), two Zebra Mongeese (*Crossarchus zebra*), one Pale Fox (*Canis pallida*), one Ratel (*Mellivora ratel*), one Black-nosed Red Monkey (*Cercopithecus patas*), one White-nosed Red Monkey (*C. pyrrhonotus*), one Grivet Monkey (*C. æthiops*), one Æthiopian Hedgehog (*Erinaceus æthiopicus*), four Ground-Squirrels (*Xerus erythropus*), five Korin Gazelles (*Gazella rufifrons*), two Oribi (*Ourebia montana*), two Addax (*Addax nasomaculatus*), one Sabre-horned Antelope (*Oryx leucoryx*), one Darfur Ram (*Ovis aries* var. ?), one Œlian's Wart Hog (*Phacochœrus africanus*), one Fish Eagle (*Haliætus vociferus*), one Eagle Owl (*Bubo cinerascens*), two Senegal, or Saddle-billed, Storks (*Ephippiorhynchus senegalensis*), one Sacred Ibis (*Ibis æthiopica*), three Golden-crowned Cranes (*Balearica ceciliæ*), three Egyptian Geese (*Chenalopex ægyptius*), three Spurwing Geese (*Plectropterus rueppelli*), three Ruffs (*Pavoncella pugnax*), two African Green Parrots (*Palæornis docilis*), two Brown-necked Ravens (*Corvus umbrinus*), one Glossy Starling (*Lamprotornis porphyropterus*), one Blue-naped Coly (*Colius macrurus*), one Kestrel (*Falco tinnunculus*), three Long-tailed Doves (*Œna capensis*), two Red-backed Sparrows (*Passer rufidorsalis*), nine Yellow Sparrows (*P. luteus*), nine Indigo Finches (*Hypochæra ultramarina*), four Bishop Finches (*Pyromelana franciscana*), ten Fire Finches (*Lagonostricta brunneiceps*), one Weaver-Bird (*Hyphantornis tæniopterus*), three Weaver-Birds (*Hyphantornis* sp. ?), six Crocodiles (*Crocodilus niloticus*), two Nile Turtles (*Trionyx triunguis*), three Terrapins (*Sternothærus adansoni*), two Leopard Tortoises (*Testudo pardalis*), one Waran Lizard (*Varanus ocellatus*). Total, one hundred and twenty-nine animals (*i.e.*, fifty mammals, sixty-five birds, and fourteen reptiles).

The last male specimen of the half-wild Apes which once were fairly plentiful on the Rock of Gibraltar has died. As "Fergy" he was known throughout Europe. He was buried, writes a 'Daily Graphic' correspondent, with the utmost decorum, his family witnessing the sad ceremony from some little distance above. Throughout the following night their lamentations could be heard.

We read the following paragraph in our interesting contemporary the 'Shooting Times' for Sept. 2nd:—"If the present conjecture prove correct, many Grouse will next year succumb to the ravages of disease. It is said that the deadly and dreaded complaint generally breaks out after a very good season; but, as nothing but the disease has much influence in reducing the stock of Grouse, and as disease comes periodically, it is natural that, when it comes, it should find a large stock, for the birds increase and multiply amazingly in its absence. It is curious that the disease always takes its course through the country in belts, often well defined on either side—so much so that one side of a burn has often been swept of the Grouse stock and the other has not been touched by the complaint. This afflicted belt has often extended for forty, fifty, and even one hundred miles, and the strange thing is that it has often jumped a valley of low ground, with no Grouse upon it for some miles, and extended its ravages to the hills upon the other side, still following the direction indicated by the first afflicted belt upon the other side of the valley. This, naturally, gave rise to the idea that the disease was carried in the air and breathed into the systems of the birds. But Dr. Klein, during his experiments in 1887, found the utmost difficulty in imparting the disease through the breath of sick birds, and could not effect it without enclosing the diseased and the healthy birds under a cloth together, and so leaving them for a night. It seems impossible to believe that contagion can be carried miles in the air that could not be carried from one bird to another in the free air of a room."

An interesting tabulated statement has been issued by the Henley Fisheries Preservation Association showing the number of fish and ova it has placed in the Thames between December, 1882, and June, 1905. These amount respectively to 36,080 fish and 177,000 ova. Particulars are appended:—

Year.	Kinds of Fish.	Quantity.	Disposed of.
1883	Loch Leven ova	45,000	In River Thames in district, some left in Nursery.
	Trout of divers kinds, yearlings to some above 1 lb. in weight	222	All in the Thames—Mill End and Henley.
1884	Loch Leven ova	30,000	5000 fry in Loddon, rest in Thames from Shiplake to Hurley.
	Trout of divers kinds, yearlings to some 2 lb. in weight	305	All in River Thames—Shiplake to Hurley.
	Loch Leven Trout, yearlings and two-year-olds	525	All in River Thames—Shiplake to Hurley.
1885	Loch Leven ova	20,000	Lost by flood and mud silt, except 1500 put in Loddon.
1886	Loch Leven ova	20,000	Part in upper water of Hambleden Brook (again flowing)*; rest in Thames and Loddon.
	Loch Leven ova (second supply)	15,000	5000 left in Nursery to grow into yearlings; rest in Thames.
1887	Loch Leven ova	15,000	All in River Thames near Henley.
	S. Fario ova	15,000	About one-third in new Nursery, Colstrop; remainder in Thames at and below Mill End.
	Grayling fry	2,000	All in Loddon.
1888	Bream—Brown or Golden (large)	90	In Thames at Greenlands and Bolney.
	S. Fario ova	12,000	In Loddon, 3000; remainder in Thames.
	S. Fario yearlings and two-year-olds	200	All in Loddon.
	S. Fario yearlings, Loch Levens and two-year-olds (a few)	1,522	All in Thames—Mill End and Marsh.
	Grayling fry	5,000	All in Loddon.
1889	Loch Leven fry	5,000	All in Thames between Shiplake and Henley.
	Bream, ½ lb. to 2 lb.	120	Thames, at Bolney & Greenlands.
1890	Two-year-old Fario, extra large	126	At Hambleden.
1891	Large yearlings, Fario	750	Between Henley & Medmenham.
	Fry (Loch Leven)	6,000	Between Henley & Medmenham.
	Loch Leven, selected two-year-old fish	200	Between Henley & Medmenham.
1892	Loch Leven yearlings	700	Between Shiplake and Hurley.
	Fario (two-year-old selected)	300	Between Shiplake and Hurley.
1893-4	Fario, 9-in. to 12-in.	400	Henley Bridge, Hambleden, and Medmenham.
	Tench	400	Henley Reach.
1895	Carp	400	Henley Reach.
	Fario (two-year-old), 9-in. to 11-in.	400	Hambleden and Medmenham.
1896	Fario—selected two-year-old	450	Henley and Medmenham.
1897	Fario—selected two-year-old	200	Henley and Medmenham.
1898	Fario—selected two-year-old	400	Henley and Medmenham.
	Roach, Perch, and Tench—large	300	Henley Bridge.

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* This brook (Hambleden), which failed in 1884 and began to flow again in March, 1896, was so strong as to wash over dams and screens, and most of these fry went down into the Thames.

YEAR.	KINDS OF FISH.	QUANTITY.	DISPOSED OF.
1899	Fario—good yearlings	1,000	Marsh to Medmenham.
1900	Tench, Carp, Roach, Rudd, Perch, and Bream	3,670	Henley to Greenlands.
1901	Fario—select. large two-year-old	500	Marsh to Medmenham.
1902	Carp, and a few Roach and Perch	2,100	Henley Bridge.
1903	Bream—Brown, from 5½-in. to 13½-in. in length	1,500	Henley Reach.
	Trout—Fario, selected large two-year-old, up to 11½ inches ..	700	Henley Reach.
1904	Trout do. do.	350	Henley Reach.
1905	Trout do. do. up to 14½ inches	250	Henley Reach (100 marked with numbered tablets).

('Angler's News and Sea Fisher's Journal,' Sept. 2nd.)

We have received a reprint of a most interesting paper on "Land Mammals of the Clyde Faunal Area," written by Mr. Hugh Boyd Watt, and published in the Transactions of the Natural History Society of Glasgow. There are some details respecting the White or Park-Cattle (*Bos taurus*):—"This semi-domesticated species has been kept in the following places in our area, *viz.*, Auchincruive, Cadzow, Cumbernauld, Ardrossan (and Eglinton Castle?), Kilmalcolm, and Kilmory (Lochgilphead). The sole surviving herd is at Cadzow, the numbers of which, as the undernoted figures show, are well maintained:—

Date.		Total Number of Animals.	Authority.
1835,	...	80 (about)	New 'Statistical Account'—Lanarkshire, p. 278.
18th July, 1877,	...	56	A. H. Cocks. 'Zoologist,' 1878, pp. 282–3.
1880,	...	40 (over)	Alston's 'Mammalia' (p. 25), *auct.* Storer's 'Wild White Cattle' (1879).
22nd Aug., 1887,	...	60	Report of Committee of the Brit. Association. 'Zoologist,' 1887, p. 403.
1888 to 1890,	...	48	W. Hannan Watson.
7th May, 1898,	...	42	H. B. Watt.
7th Oct., 1899,	...	44	H. B. Watt.
1900,	...	49	'Scots Pictorial,' 15th Oct., 1900, p. 301.
11th Apr., 1902,	...	53	H. B. Watt.
3rd Oct., 1903,	...	71	H. B. Watt.

In 1886 fresh blood was introduced from Chillingham, and in 1898 one bull and four cows were brought in from Vaynol Park, Carmarthenshire, for cross-breeding. The original stock at Vaynol was from Kilmory, and consisted of twenty-two animals transferred previous to 1897. The Kilmory herd was raised, previous to 1845, from a white bull (which was understood to have come from that portion of the Blair Atholl stock which had gone to the Earl of Breadalbane in 1834), and from white or dun Highland cows. The last of the Kilmory beasts were disposed of in 1903. I can add nothing to the account given by Mr. J. E. Harting ('British Animals extinct within Historic Times,' 1880) of the Auchincruive and Ardrossan herds. The animals, which were at Kilmalcolm previous to 1845, were brought from Eglinton, and were probably the same stock as the Ardrossan ones. The historic 'quhit bullis' of Cumbernauld mentioned by Boece (A.D. 1527), Bishop Leslie (1578), and Monipennie (1597), if not entirely destroyed by the Earl of Lennox in 1570, may have some connection with the Cadzow herd, the origin of which is not known."

We are informed that on August 4th a pure white Ringdove with pink eyes was shot near Scarborough, the only one on record there. A Pied Stockdove and a Yellowhammer have also been obtained at same locality. The three birds are now being preserved by Mr. John Morley, King Street, Scarborough.

From the Magyar Ornithologiai Központ, Hungarian Central Office of Ornithology, we have received a communication on 'The Economical Importance of the Rook (*Corvus frugilegus*, L.) in Hungary,' by Titus Csörgey, Adjunctus of the Institute. From the examination of the contents of four hundred and seventy stomachs of these birds a number of valuable conclusions have been arrived at.

The Rook feeds principally on insects and mice, but from spring to autumn, and on cold wet days of the warmer season, it also subsists on vegetable food.

During spring and autumn sowing time it picks up the seeds lying on the surface or those not sufficiently covered, as it does, in some parts, with the feeding-corn sown by machine. This damage is insignificant, leaving hardly any traces in the sprouting seeds. In some parts it preys on the ripe ears, without, however, doing great harm; this occurs chiefly when there is a great drought, when the pastures catch fire, and when, therefore, there is no sufficient supply of insect-food.

That it also exercises in regard to cattle-rearing an extremely important activity is proved by the observations of Béla v. Hauer, an estate owner. He tells us that the Rook, on the pastures, not only frees the domestic animals from their external parasites, but that it pulls the *gastrus larvæ* from the exposed anus of Horses, and that it picks also the "proglottidæ" of *Tænia cœnurus* from the dung of shepherd's-dogs, thus limiting the spreading of the staggers of Sheep.

Game-raising is in no way compromised by the Rook; and it thus differs from *Corvus cornix* and *corone*. It never attacks young Hares, and never destroys birds' eggs. It has been proved by experience that small game and singing-birds multiply even in the neighbourhood of strong colonies.

BRITISH 11 DE 1905 MUSEUM